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AMERICAN POTATO JOURNAL

PUBLISHED BY

THE POTATO ASSOCIATION OF AMERICA

EAST LANSING, MICHIGAN

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Certified Seed Potatoes and Seed Disinfection

WM. H. MARTIN, Agr. Expt. Station, New Brunswick, N. J.

We frequently have complaints from buyers of certified seed potatoes to the effect that some of the tubers show scab and rhizoctonia infection. In a number of cases the buyer has insisted that he will not accept the seed since he has purchased certified seed potatoes and as such they should be free from all diseases. This has been such a common occurrence that it is considered advisable to call the potato growers' attention to the fact that all the states certifying seed potatoes permit some scab and rhizoctonia on certified seed.

An examination of the tolerances on scab in effect in the different states in 1930 shows that eight states permitted 10 per cent; one allowed six per cent; five, five per cent; and one, three per cent. A number of terms are used to describe the type of infection permitted; among these are, slight infection, light infection, noticeably affected, moderate infection, practically free, and no deep pustules. The tolerance with respect to rhizoctonia likewise varies in the different states; three allow 12 per cent; seven 10 per cent; and two, five per cent. As in the case of scab, numerous terms are used to describe the amount of rhizoctonia permitted; some of these are, 10 per cent slight, noticeably infected, slight infestation, moderate infection and small amount of light infection. A few states attempt to be more specific. In one state, for example, the statement is made that the tolerance is 12 per cent, no spot larger than one-eighth inch in diameter and no rhizoctonia bodies more than one-sixteenth inch in diameter. Another state permits a moderate infection and defines this as "a small number of spots on a small number of tubers.' Minnesota has

a definition which really defines, but for most states the tolerance is much too high. Moderate infection is permitted and this is defined as "tubers containing more than 25, or less than 50 rhizoctonia bodies (sclerotia) varying in size from one-eighth to one-quarter inch in diameter. With 50 sclerotial bodies of the latter size the aggregate would be 12 inches. This would permit of much heavier infection than the Eastern purchaser of seed potatoes would tolerate."

In several states no statement is made concerning the tolerance of either scab or rhizoctonia. In those states the standards for certified seed are approximately the same as for table stock graded to meet the requirements of U. S. Grade No. 1. Since several of these states are selling seed potatoes in New Jersey, the standards for U. S. Grade No. 1 are given below.

"U. S. Grade No. 1 shall consist of potatoes of similar varietal characteristics which are not badly misshapen, which are free from freezing injury and soft rot, and from damage caused by dirt or other foreign matter, sunburn, second growth, growth cracks, hollow heart, cuts, scab, blight, dry rot, disease, insects, or mechanical or other means.

The diameter of potatoes of round varieties shall be not less than 1⅞ inches and of potatoes of long varieties 1¾ inches, but lots of potatoes which are not less than 1½ inches in diameter and which meet the remaining requirements of this grade may be designated 'U. S. No. 1, 1½ inches minimum.'

In order to allow for variations incident to proper grading and handling, not more than five percent, by weight, of any lot may be below the prescribed size. In addition, not more than five per cent, by weight, may be damaged by hollow heart, and not more than six per cent may be below the remaining requirements of this grade, but not to exceed one-sixth of this amount, or one per cent, shall be allowed for potatoes affected by soft rot."

It will be observed that rhizoctonia is not mentioned in these standards. Scab is mentioned, but no statement is made concerning the tolerance. In the U. S. Grade Standards, "free from damage, mean that the appearance shall not be injured to an extent readily apparent upon casual examination of the lot, and that any damage from the causes mentioned can be removed in the ordinary process of preparation for use without appreciable waste. Loss of outer skin (epidermis) shall not be considered as an injury to the appearance."

It is apparent from this that seed from a state having the U. S. Grade No. 1 as the certified seed standard may show considerable amounts of scab and rhizoctonia and still be certified. It would be possible, for example, for as many as 50 per cent of the tubers to be slightly infected with rhizoctonia

and still make U. S. Grade No. 1. In view of this fact, if the grower purchases certified seed from states having the U. S. Grade as the standard for certification he has no redress if the seed is found to show fairly large amounts of scab and rhizoctonia. On the other hand if seed from those states stating a definite tolerance on these two diseases show amounts in excess of the stated tolerance there is some chance of an adjustment.

It should be pointed out, however, that the buyer of certified seed potatoes is expecting too much when he asks that certified seed be free from all diseases. Some growers have gone so far as to say that since some rhizoctonia and scab are permitted on certified seed it would be better to purchase table stock which is free from these two diseases. This would be a very serious mistake on the part of the potato grower. It must be kept clearly in mind that the appearance of the tuber is not a guide to its yielding capacity. In our work with leaf roll in South Jersey, for example, we have harvested tubers of excellent shape, color and entirely free from rhizoctonia and scab from hills severely diseased with leaf roll. Growers who saw this seed stated that they would like to have 100 sacks just like it. They were judging by appearances only. This same seed when planted the following year produced only a third of a crop. One of the chief aims of certification is to eliminate such diseases as mosaic, leaf roll and spindle tuber. These diseases are carried in tubers from diseased plants and cannot be detected in the potato after it is harvested. When certified seed is purchased from any section one is reasonably certain that there will be little, if any, of these diseases present. On the other hand, the grower who purchases table stock because of the fact that the tubers are free from scab and rhizoctonia may find the three diseases mentioned above in large quantities in the growing crop.

A number of growers have raised the question as to why any rhizoctonia or scab should be permitted on certified seed. The answer to this is obvious. If none were permitted very little seed could be certified. In South Jersey this year, for example, some growers in order to meet the requirements of certification found it necessary to grade out nearly half their crop. If no rhizoctonia were permitted, the amount of seed certified would have been extremely small. This applies with equal force to every other seed growing section. The grower of seed potatoes has complained for a number of years of the fact that there was little return for the extra work necessary for growing seed potatoes. If no rhizoctonia were permitted it is obvious that he could not afford to continue growing seed potatoes for certification. It is unfortunate that it is necessary to tolerate this disease on certified seed, but until we devise some satis-

factory method of eliminating the rhizoctonia organisms from the soil, it will continue to be necessary.

In view of the fact that it is practically impossible for a section to produce any quantity of seed free from rhizoctonia the only thing we can do is face the facts. We have a simple and effective control measure for this disease on the seed, whereas when leaf roll, mosaic or spindle tuber appear in the crop there is nothing to be done but take the loss which is certain to result from their presence. It is interesting to note in this connection that many of our most progressive potato growers are no longer greatly concerned about the presence of rhizoctonia or scab on their seed potatoes. They realize that it is impossible to expect that all seed will be entirely free from these troubles and consequently have made seed potato disinfection one of the steps in growing the crop. Some years ago when the only method of seed disinfection available was the hour and a half soak in corrosive sublimate the grower was reluctant to adopt the treatment due to the large amount of time necessary for the operation. With the present instantaneous dips, however, this objection to seed disinfection has been removed and the practice is becoming more generally adopted each year. It is of course an additional expense to potato growing and it is unfortunate that it must be done. In view of the fact, however, that most seed potatoes carry some rhizoctonia or scab and since seed disinfection is known to pay, the only course left for the potato grower is to adopt the practice.

For the information of seed buyers we present the tolerances on scab and rhizoctonia in effect in the various sections from which most of the seed potatoes are purchased by New Jersey growers. These standards were in effect in 1930 and as far as is known were not changed in 1931, except in New Jersey where new standards were adopted this year.

CANADA—Scab, 10 per cent slight or 5 per cent severe. Rhizoctonia, 10 per cent slight or 5 per cent severe.

MAINE—"Shall equal or exceed U. S. grade No. 1."

MARYLAND—Scab, slight infection allowed ("slight infection means a small number of shallow scab spots"). Rhizoctonia—Moderate infection ("moderate infection means a small number of spots on a small number of tubers").

NEW JERSEY—The presence of more than 10 per cent of tubers having an average of more than five shallow scab spots which exceed in the aggregate an area of one inch in diameter; or more than five per cent of the tubers having more than three deep scab spots which exceed in the aggregate an area of one inch in diameter; or more than a total of 10 per cent of the tubers showing shallow or deep scab. The

presence of more than 10 per cent of the tubers having more than five scurfed areas which exceed in the aggregate an area of more than one inch in diameter; or more than 50 sclerotial bodies covering in aggregate an area of one inch in diameter; or more than five per cent of the tubers having more than 25 sclerotial bodies covering an aggregate of two inches; or more than a total of 10 per cent of the tubers showing any form of rhizoctonia.

NEW HAMPSHIRE—Scab—10 per cent, no spot larger than one-quarter inch in diameter, nor so numerous as to blemish the tubers. Rhizoctonia—A slight infestation.

NEW YORK—"Shall be graded to conform to U. S. Grade No. 1."

VERMONT—Scab—6 per cent. Rhizoctonia—10 per cent seriously affected.

In connection with the tolerances for these two diseases it should be pointed out that the standards in effect in New Jersey this fall were used for the first time and proved to be very satisfactory from the standpoint of the inspector, the grower and the purchaser of certified seed. Standards similar to these have been suggested to the other states and it is earnestly to be desired that in the near future all states will operate under the same grade standards, as this would eliminate many of the difficulties confronting certification at the present time. In the meantime, the local potato grower is safe in the thought that when he purchases certified seed he is getting the best seed obtainable, but he must understand the fact that the use of certified seed does not eliminate the need of disinfecting it for the control of rhizoctonia and scab.

A Summary of Recent Potato Investigations in Louisiana

By JULIAN C. MILLER and W. D. KIMBROUGH,
Louisiana State University, Baton Rouge, Louisiana

To obtain information over a range of soil and climatic conditions, experiments were conducted at Houma, at Louisiana State University and at Alexandria. The Triumph variety of potatoes was used in all the experiments and all, other than the fertilizer tests, were given similar fertilizer treatment. The fertilizer, at the rate of 800 pounds per acre, was applied in

the furrow at planting time and mixed with the soil before the potatoes were dropped. The seed pieces were accurately cut so as to average 1.5 ounce each. The seed pieces were placed 12 inches apart in the row and the rows were 3.5 feet apart at Louisiana State University and Alexandria and 5.5 feet apart at Houma. To partially overcome soil variation, each treatment was replicated five times.

Experiments are being conducted to determine:

(1) the fertilizer requirements of the potato in Louisiana;
(2) the effect of the size of the seed piece on yield;
(3) the effect of the planting distance on yield and grade;
(4) the value of ethylene chlorhydrin for breaking the rest period;
(5) the best cultural practices.

In some of the fertilizer experiments nitrogen, phosphoric acid and potash were varied in order to determine the most profitable percentage of each to use. It was found that in 1930, a very dry year, 2% nitrogen was most profitable. In 1931, however, nitrogen was profitable in all tests and gave increased profits to the maximum application which was 6%. The 1931 season was very favorable to potato production. From 8 to 12% was the most profitable range of phosphoric acid. Variable results were obtained from the application of potash. In some of the tests profitable returns were obtained from applications as high as 8% while in others potash applications did not pay.

A 4-8-4 fertilizer was applied in rates ranging from 400 to 2000 per acre. The higher rates of application were most profitable. Increases obtained from applications above 1000 pounds were small however. Nitrate of soda at the rate of 200 pounds per acre applied as a top dressing to plats receiving 800 pounds of 4-8-4 per acre gave more profitable returns than the heaviest application of complete fertilizer alone. Three different sources of inorganic nitrogen were applied as top dressings and all gave profitable returns. Also muriate of potash applied as a top dressing gave a profit.

Concentrated fertilizers, as Ammophoska and Nitrophoska, were tested in comparison with a 4-8-4 fertilizer. Rates applied were based on nitrogen equivalents. No significant differences were obtained between the concentrated fertilizers and the 4-8-4.

In the size of seed piece test the following sizes were tested: 0.5 oz., 1.0 oz., 2.0 oz. and 2.5 oz. The best returns were ob-

tained with the 1.0 oz. and 1.5 oz. seed pieces, with no significant difference between them.

The following intervals were used in the planting distance test: 8 in., 10 in., 12 in., 14 in., and 16 in. For the two years of this test the 14 in. spacing has been superior to the closer spacings.

Ethylene chlorohydrin has been tested for its effect on hastening the sprouting of fall grown potatoes used for seed. The treated potatoes, in the tests at Houma, showed that the treatment had a slight hastening effect on germination. Yields obtained were also somewhat higher. Tests at Baton Rouge showed no advantage for the treatment.

The cultural practices experiment included the following: narrow rows, 3½ ft. wide, with half the area planted to potatoes and half to corn; wide rows, 7 ft. wide, with corn planted in the middles; wide rows, 7 ft. wide, with double rows of potatoes and no corn in the middles. The wide rows produced higher yields where equal areas were planted to both potatoes and corn. The narrow single rows showed greater returns than an equal area planted to wide double rows.

The Michigan State Potato Show, 1932

J. J. BIRD, Michigan State College, East Lansing, Mich.

The 1932 State Potato Show of the Michigan Crop Improvement association, which was held during Farmers' Week at Michigan State college, February 1-5, continued to maintain the high standard of quality of exhibits that characterized this event in past years. The one hundred and ninety exhibits entered represented the best in quality from all of the potato districts of the state, having been selected as winning samples from a total of twelve hundred and forty exhibits shown at the five regular district potato shows held during October and November, 1931. Eighty-seven of the one hundred and ninety exhibits were entered by adults, fifty-nine by 4-H club members and forty-four by high school Smith-Hughes project students. Twenty-eight counties were represented by these exhibits. The show was judged by Professor A. G. Tolaas of the University of Minnesota.

The sweepstakes cup, offered for the best peck of any variety, was won by John Tennant of Manistique, Schoolcraft county, on a sample of White Rurals. This is the first time that the White Rural variety has won this honor at the state show.

Reisner Brothers and Hoppe of Hawks, Presque Isle county, took first place in the Russet Rural open class; John Delongchamp of Champion, Marquette county, was first in Green Mountains; and J. D. Robinson of Pellston, Emmet county, was first in Irish Cobblers. In the "any other variety" class, Forrest Terry of Greenville, Montcalm county, took first on a peck of Russet Burbanks.

The certified seed class was of exceptionally high quality, representing five of the certified seed growing counties. This is the only class requiring bushel samples for exhibits.

Reisner Brothers and Hoppe, for several years certified seed growers in Presque Isle county, were awarded first premium on their bushel of Russet Rurals. Frank Guy, Pellston, received second award on Russet Rurals. In the "any other certified varity" class, Russel Tennant of Manistique, won first place on a bushel of White Rurals, and J. D. Robinson, Pellston, won second place on a bushel of Irish Cobblers.

It is of special interest to note than in the open classes of Russet Rural, White Rural, Green Mountain and Irish Cobbler, the four varieties most highly recommended for Michigan growers and most commonly certified—classes in which competition is open to all growers whether certified seed or tablestock producers—twenty-two of the twenty-seven exhibitors winning prizes in these classes were certified seed growers. When it is considered that only a small fraction of the potatoes produced in Michigan are certified, this situation indicates the high quality that results from employing the best recommended potato growing practices and also indicates the greater interest taken in the product itself as evidenced by the fact that a greater proportion of certified growers exhibit than do tablestock growers.

County exhibits, consisting of ten samples of any variety, were exhibited by Emmet, Presque Isle, Alpena and Iron counties. Honors were won in the order named. This class was exceptionally uniform in every respect and was a fitting tribute to past efforts to improve the quality of the potato. County exhibits are the best indicator of the potato interest and general quality of stock in a county. These exhibits also indicate the tendency to standardize on a limited number of varieties. Ninety per cent of the forty individual samples in the four county exhibits consisted of the Russet Rural variety. White Rurals and Green Mountains completed the class.

Emmet county proved strong in the 4-H Club county exhibit as well as in the senior division. Seven county club exhibits were entered in this class. Osceola county took second place. An exhibit in this class consisted of five samples of any variety from one county.

In the individual classes in this department first place in Russet Rurals was won by Howard Butler of Crystal Falls in a class of forty-one entries. This was an exceptionally good class of exhibits and exceeded by seven entries the Russet Rural class of last season, indicating the growing interest in potato project work among 4-H club members.

In the Smith-Hughes project work, ten schools were represented at the show with a total of forty-four entries. In the school exhibit class, consisting of five samples from one school, Reed City won first honors and Dowagiac second. Graydon Blank of Reed City was first prize winner in both the Russet Rural class and the "any other variety" class on a peck of Russet Burbanks.

In the best single potato class, open to senior and junior departments alike, ten exhibits were entered. A White Rural grown by Russell Tennant of Manistique was selected as being the best type for the variety.

Premier Grower Contest

Mr. John Delongchamp of Champion, Marquette county, grower of certified Green Mountains, won the honor of being Michigan's outstanding potato grower in 1931, in the final event of the Michigan Premier Potato Growing contest held in connection with the State Potato show. Incidentally, Mr. Delongchamp's yield of 538 bushels per acre set a new record for yield per acre in Michigan. The contest is based upon the yield per acre, quality of crop and showmanship. On this basis elimination contests were conducted at all of the five regular district potato shows. The following district winners competed for the honor of Premier Grower at the State Show:

Area	Name	Address	Yield
Upper Pininsula,	John Delongchamp,	Champion,	538 bu.
Top O' Michigan,	Pearl Bonter,	Pellston,	376 bu.
Western Michigan,	George McLachlan,	Evart,	350 bu.
Thumb of Michigan,	Lee Fowler,	Mayville,	276 bu.
Southwestern Michigan,	John Woodman,	Paw Paw,	261 bu.

By virtue of his winning the title of "Premier Grower" for 1931, Mr. Delongchamp will receive as a prize, approximately $100.00 to be used to defray expenses on an out-of-state potato tour during the coming season.

The 1931 contest was the third annual event of its kind in Michigan, and to date ninety growers of certified seed and high quality table stock have entered. The event has created much interest at all of the potato shows in the state and has made possible the comparison of production methods employed by different classes of growers in all of the potato producing

areas, since each contestant is required to furnish a complete outline of production methods followed.

The winning of this contest by an Upper Peninsula grower adds much to the interest in this event in the future. The Lower Peninsula growers, having a slightly longer growing season, will depend largely upon the Russet Rural variety to cop the title, while those in the Upper Peninsula, though having a shorter growing season, but an advantage in a greater amount of moisture and lower temperature during July and August, will depend upon the Green Mountain and the Russet Rural for state yield records each year.

Crop and Market News

Early Southern Potatoes Doing Fairly Well

(Contribution from the Bureau of Agricultural Economics)

Reported plantings of 1932 commercial potato acreage in the early states, while somewhat greater than was indicated by growers' reported plans early in January, still represents a sharp decline from last year's shipping acreage. The estimated commercial planting of 31,900 acres in Florida and the lower valley of Texas is 21% smaller than the 1931 acreage and just slightly in excess of the small acreage of 1929. Florida has reduced its acreage 20% and the Lower Valley 24%.

In the early shipping areas, comprising six states and Texas counties outside of the lower valley, the planting is estimated to be 71,450 acres, which is 30% less than a year ago and the smallest acreage since 1929. California, which was not included in the January intention report, shows a decrease of 12%, while the remaining states in this group are cutting their commercial early acreage by one-third or about as planned a month ago. Georgia reports a reduction of 50%, South Carolina 42%, Alabama and Mississippi 37%, Louisiana 32% and other Texas 23%.

An early February report on the progress of the crops in Florida and Texas included the following information:

Planting around Federal Point in Flagler county, Florida, began the first of December. Since that time weather conditions have been very favorable for rapid growth. Vines are large and there are some No. 1 potatoes on them already. Growers expect to start digging the last week in February,

which is considerably earlier than usual. Movement from these early areas will be quite heavy in March. The main crop at Hastings was in the ground by the first of February, the heavy plantings having been made during January 11 to 23. Many of these fields of potatoes are coming through the ground at present. Planting in La Crosse section was completed during January and began earlier than usual. There was one field in which potatoese were practically up to a stand. There has been sufficient moisture in that section to insure germination.

Most of the crop in the lower Rio Grande valley of Texas was planted early in January and is somewhat earlier than usual. The crop is up and has made a good start. Late blight, which caused considerable concern a year ago, is reported in a few fields at this early date; however, this disease was reasonably well controlled last season.

The heavy rains in the Eagle Lake-Sugarland-Wharton area and in many north Texas counties will probably result in plantings being delayed, as growers have been unable to prepare their fields for planting. The Eagle Lake-Sugarland-Wharton acreage is expected to be decreased about 26% and other counties 19%.

Market receipts of new potatoes were still very light in mid-February. Bushel hampers of Florida Bliss Triumphs were jobbing in a few cities at $1.75-$2.50, while the 50-pound sacks from Texas sold at a range of $1-$1.50. Barrels of red potatoes from Bermuda brought $8.50-$9 in New York City, and Florida Spaulding Rose sold there at $6.50.

Total shipments of old potatoes had decreased during early February to about 3,400 cars per week, compared with 4,800 a year ago. Markets were unsettled and prices were generally declining at important shipping points. The western New York market on Round Whites was ranging 63c-68c per 100-pounds sacked. Northern Maine dropped to 43c on Green Mountains. The Michigan f. o. b. market was lower at 53c-57c but Wisconsin ranged 55c-58c. Bliss Triumphs returned 50c-55c in western Nebraska. The southern Colorado cash market was lower at 40c-60c per 100 pounds, while northern Colorado weakened on the usual-terms basis to 47c-49c. Southern Idaho remained about steady on Russet Burbanks at 60c, and the Yakima Valley of Washington reported sales at $11-$12 per ton.

The Chicago carlot market was firm on northern Round Whites at 80c-85c and stronger on Nebraska Triumphs at $1.15-$1.20 per 100 pounds, but Idaho Russet Burbanks were weaker at $1.35-$1.45. March futures on Idaho Russets were lower at an asking price of $1.50, with Round Whites at 85c and Maine Green Mountains at 92c.

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Notes

NEBRASKA

The annual meeting of the Nebraska Certified Potato Growers will be held March 17. This meeting covers all matters of interest to the certified growers, regulations for certification, annual reports for the season just closed and prospects for the coming season.

—MARX KOEHNKE.

Review of Recent Literature

Wilson, A. L. and **Hardenburg, E. V.** Potato Storage on 259 Farms in New York. Cornell Univ. Agr. Exp. Sta. Bul. 526, August 1931.

This is a report on potato farm storage as an important phase of the potato industry of New York. The authors visited and studied in detail 259 farm storages including 144 house cellars, 44 barn basements, 54 bank storages, and 17 special storages. The object was primarily to find out just how the crop is stored, details of storage construction and management, relative efficiency of different types of storage and to recommend changes and improvements in existing farm storage structures. Bills of materials and plan and elevation drawings of four of the best bank storages are presented.

A comparison of mean temperatures and relative humidity in their effect on estimated shrinkage of tubers in all four types of storage is given in tabulated form. Shrinkage averaged least in the bank storages where temperature was lowest and humidity highest while it was highest in the house cellars where temperature was highest and humidity lowest. About three-fourths of the growers sell all or part of their crop at harvest time, giving as their primary reason, need for cash. A higher percentage of storage capacity is used when the crop is large than when it is small. Only a small proportion of growers use their entire storage capacity. The need is not for more but for better storage. The principal defect in existing storage is lack of provision for the removal of excess moisture during a part of the storage period. Better insulation and ventilation equipment would remedy this defect. A temperature range of 37° to 40°F. and a relative humidity of at least 90 per cent is recommended.

—E. V. HARDENBURG.

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